

Human Nutrition and Food Safety

Food as Medicine: Gut Health, Immunity, and Inflammation

The physiological pathways through which food influences the body

Key Concept

Food as medicine operates through interconnected body systems such as the gut, immune regulation, and inflammation, rather than through a single targeted mechanism (NCCIH, 2021; NCCIH, 2022).

Beyond symptoms: How food works in the body

A healthy diet helps the body stay strong, recover better, and keep its systems balanced. This means food is not important only when a person is sick. It is also important for staying healthy. Food has a strong effect on three main parts of the body: the gut, the immune system, and inflammation. These three components of the body are interconnected. When we eat well, the gut works better, the immune system becomes stronger, and the body can control inflammation more effectively. This helps explain why our daily food choices can have a major impact on our health over time. (NCCIH, 2021; NCCIH, 2022).

The Digestive System

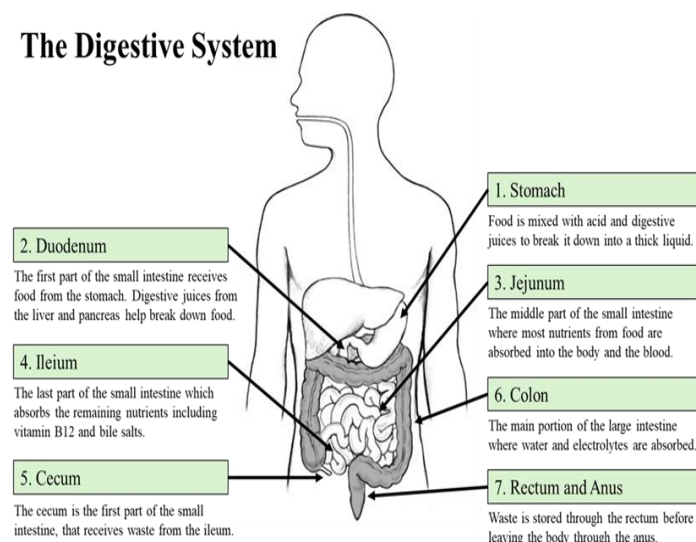


Figure 1. The human digestive system and the function of key organs in the digestive process

In general, minimally processed plant-based diets promote higher levels of microbial diversity and a healthier inner gut. Conversely, diets rich in highly processed foods, low in fiber and high in additives are linked to low microbiome diversity and gut dysfunction (CDC, 2026; NCCIH, 2021).

This is especially true of fiber. Good microbiotas facilitate the fermentation of fiber (prebiotic) obtained from legumes, fruits, and vegetables and release short-chain fatty acids. Dietary fiber from fruits, vegetables, legumes, and whole grains feeds beneficial gut bacteria during digestion,

producing short-chain fatty acids that protect the gut lining and support broader metabolic and immune function (Fernandes et al., 2023).

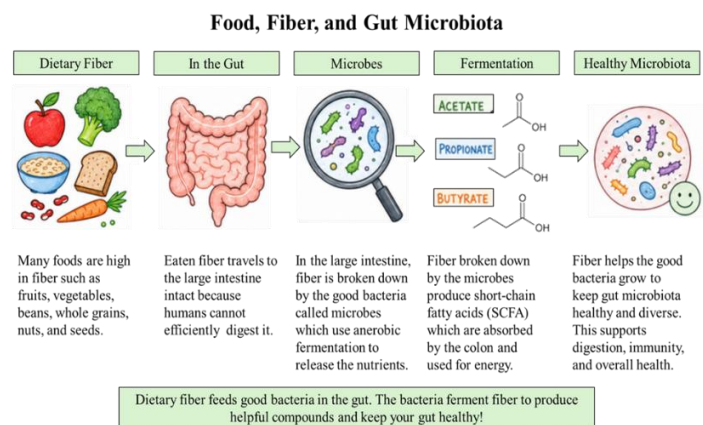


Figure 2. The relationship among food, fiber, and gut microbiota.

Food and immune function

The connection between diet and immune functioning is well studied. Micronutrients such as vitamins A, C, D, and E, zinc, selenium, and iron are vital in the formation of immune barriers and the overall operation of cellular immune system cells. Lack of these nutrients undermines the body's ability to mount effective responses to infection and maintain tolerance to self-tissues (Lungu et al., 2022).

The regular inclusion of a wide variety of whole foods ensures the body receives micronutrients in their most bioavailable forms, supporting immune barriers and cell function (Mitra et al., 2022). By contrast, ultra-processed, energy-dense diets are consistently poor in this regard.

Chronic inflammation and dietary patterns

Inflammation is an innate defensive biological process. In the acute setting, it helps the body react to injury and infection. However, low-grade, long-term inflammation without a specific trigger contributes to the development of major chronic conditions such as cardiovascular and cerebrovascular disease.

Dietary preferences influence chronic inflammation levels. Diets high in saturated fat and ultra-processed foods are linked with elevated systemic inflammation. Conversely, whole-food, plant-based diets rich in fiber are associated with fewer inflammatory markers and reduced risk of inflammation-related disease (NCCIH, 2021; NCCIH, 2022).

An integrated view of food and health

Health outcomes do not arise from singular symptoms or isolated factors. A holistic view is essential to understanding food as medicine. The gut, immune system, and inflammatory regulation are dynamic, interconnected systems in which diet plays a critical role.

Food as medicine is best understood as a pattern of nourishment rather than a targeted therapeutic agent. The cumulative, systemic effects of consistent dietary quality on gut health, immunity, and inflammation represent one of the most compelling mechanisms through which food protects and promotes health across a lifetime (NCCIH, 2021; ODPHP, 2025).

Sources

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